



Case History

New Trendmaster® 2000 System quickly results in savings



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Florida Power Corporation's Anclote Plant is located on the Gulf of Mexico, twenty-five miles northwest of Tampa. The plant has two 500 MW oil-fired units which came on-line in 1974. In 1981, two mechanical draft, saltwater cooling towers were added.

Recently, the plant completed the first phase of a Bently Nevada Trendmaster® 2000 installation. The installation includes a system computer and printer, a 1500 foot data highway, 24 transducer interface modules and 24 velocity transducers.

Phase one is monitoring 24 cooling tower gearboxes which historically have been difficult to monitor and diagnose. Because of the required availability of the fans for the plant thermal discharge permit, monthly manual data collection is difficult to schedule. Periodic manual readings also did not give enough trending information to properly predict and diagnose gearbox failure. Additionally, the gearboxes, located 1200 feet from

the plant and 60 feet above ground level, make manual data collection a major inconvenience.

Trendmaster® 2000 was selected due to its cost-effectiveness in running a single data highway to this remote location. This application did not require a continuous monitoring system; however, the sample rate of the Trendmaster® 2000 is fast enough to collect all the

information necessary to diagnose gearbox condition.

Phase two of the installation will begin in 1993. A planned expansion of about 40 points will monitor balance of plant (BOP) equipment such as forced draft fans, condensate pumps, burner pumps and circulating water pumps.

The Trendmaster® 2000 System computer, located in the plant control room, is used by operators to monitor alarm status. It will also be used by plant staff personnel to trend vibration levels and to analyze problems. It is hoped that this system will minimize, if not eventually eliminate, the need for monthly contractor data collection. *This could result in an annual plant savings of approximately \$20,000.*

Data presentation from the computer includes:

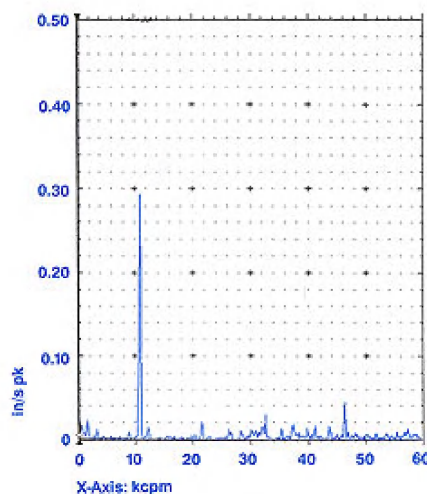


Figure 1
Spectrum Plot of fan 1-1 taken on 28 February indicates a spike at 11,000 cpm.

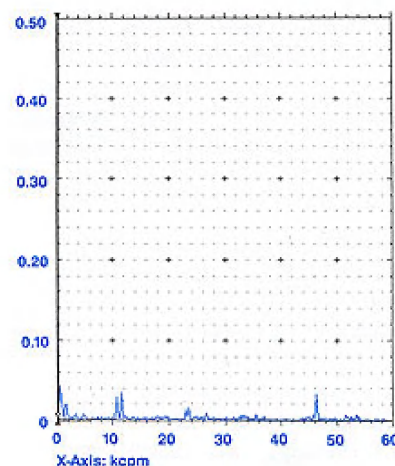


Figure 2
Spectrum Plot of fan 1-1 on 21 May after a misalignment problem was corrected.

- Current value readings
- 30 day, 90 day, or 270 day trend plots
- Timebase plots
- Orbit plots
- 400 line Spectrum plots
- Spectrum versus Time plots
- Plot comparisons

The initial installation was completed in February 1992 during the plant's annual cooling tower maintenance outage. Data collected from the initial run of the cooling tower fans immediately revealed a problem with fan 1-1. Figure 1 shows the Spectrum plot taken on 28 February. The 0.3 in/sec spike is at

11,000 cpm which is the fundamental gearmesh frequency of the intermediate-output gear. The second and third harmonics are also present. It was suspected that these gears were misaligned, and the gearbox was removed and disassembled. Misalignment was noted and corrected. Figure 2 is the 21 May signature of the same gearbox.

Failure of the gearbox during the operating season could have resulted in \$15-20,000 in unscheduled maintenance costs. Of more consequence to the plant, loss of the gearbox could have resulted in violation of the Environmen-

tal Protection Agency Thermal Discharge Permit.

Present trending indicates a backlash problem in the input-spiral bevel gear of gearbox 1-12 and gear looseness in gearbox 1-2. These problems will continue to be trended until maintenance can be scheduled. The Trendmaster® 2000 System has already paid for itself and is proving to be a valuable tool in predictive maintenance at the Anclote Plant. ■

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